

## WHAT IS CLAIMED IS:

1. A live adenovirus formulation comprising chlorobutanol.

5 2. A live adenovirus formulation of claim 1 wherein the formulation contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

10 3. A live adenovirus formulation of claim 1 wherein the formulation further comprises at least one inhibitor of free radical oxidation.

15 4. A live adenovirus formulation of claim 3 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

5. A live adenovirus formulation of claim 3 wherein the inhibitor of free radical oxidation is selected from the group consisting of EDTA, ethanol, histidine, or combinations thereof.

20 6. A live adenovirus formulation of claim 5 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

25 7. A live adenovirus formulation of claim 5 wherein the formulation further comprises a buffer, a cryoprotectant, a salt, a divalent cation, and a non-ionic detergent.

8. A live adenovirus formulation of claim 7 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

30 9. A live adenovirus formulation of claim 1 with an adenovirus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L.

10. A live adenovirus formulation of claim 9 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

5 11. A live adenovirus formulation comprising chlorobutanol, wherein the formulation has been filled to present a multi-dose image.

10 12. A live adenovirus formulation of claim 11 wherein the formulation contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

13. A live adenovirus formulation of claim 11 wherein the formulation further comprises at least one inhibitor of free radical oxidation.

15 14. A live adenovirus formulation of claim 13 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

20 15. A live adenovirus formulation of claim 13 wherein an inhibitor of free radical oxidation is selected from the group consisting of EDTA, ethanol, histidine, or combinations thereof.

25 16. A live adenovirus formulation of claim 15 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

30 17. A live adenovirus formulation of claim 15 wherein the formulation further comprises a buffer, a cryoprotectant, a salt, a divalent cation, and a non-ionic detergent.

18. A live adenovirus formulation of claim 17 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

19. A live adenovirus formulation of claim 11 with an adenovirus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L.

5           20. A live adenovirus formulation of claim 19 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

10           21. A filled multi-dose vaccine vial comprising live adenovirus and chlorobutanol.

          22. The multi-dose vaccine vial of claim 21 wherein the formulation contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

15           23. The multi-dose vaccine vial of claim 21 wherein the formulation further comprises at least one inhibitor of free radical oxidation.

20           24. The multi-dose vaccine vial of claim 23 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

25           25. The multi-dose vaccine vial of claim 23 wherein an inhibitor of free radical oxidation is selected from the group consisting of EDTA, ethanol, histidine, or combinations thereof.

          26. The multi-dose vaccine vial of claim 25 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

30           27. The multi-dose vaccine vial of claim 25 wherein the formulation further comprises a buffer, a cryoprotectant, a salt, a divalent cation, and a non-ionic detergent.

35           28. The multi-dose vaccine vial of claim 27 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

29. The multi-dose vaccine vial of claim 21 with an adenovirus concentration in the range from about  $1 \times 10^7$  vp/mL to about  $1 \times 10^{13}$  vp/mL and a total osmolarity in a range from about 200 mOs/L to about 800 mOs/L.

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30. The multi-dose vaccine vial of claim 29 wherein the formulation further contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation..

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31. A method of preserving a live adenovirus formulation which comprises adding chlorobutanol to the formulation, such that addition of chlorobutanol maintains adequate antimicrobial effectiveness while maintaining stability of the adenovirus for at least one year when stored at 2-8° C.

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32. The method of claim 31 wherein the formulation contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.

33. The method of claim 31 wherein the formulation is filled as a single dose image.

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34. The method of claim 31 wherein the formulation contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation..

35. The method of claim 31 wherein the formulation is filled as a multi-dose image.

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36. The method of claim 35 wherein the formulation contains from a lowest effective concentration of chlorobutanol up to the solubility limit of chlorobutanol for said formulation.